

What is claimed is:

1. A power converter including a plurality of power units, each of said power units comprising:

an input transformer group including at least one input transformer having at least one primary winding connected with a first polyphase AC power supply and at least one secondary winding;

a polyphase self-excited rectifier circuit connected with said secondary winding; and

a single-phase self-excited inverter circuit connected with said polyphase self-excited rectifier circuit through a DC link circuit to generate a single-phase power output;

wherein mutually adjacent ones of said power units in each phase are sequentially cascaded in series with one another, with one of said power units at one end of the cascade connection being connected with a polyphase AC load, another one of said power units at the other end of the cascade connection being connected with a neutral point, whereby electric power is input from said first polyphase AC power supply to said power units and output therefrom to said polyphase AC load, or the electric power of said polyphase AC load is regenerated to said first polyphase AC power supply.

2. The power converter as set forth in claim 1, wherein said polyphase self-excited rectifier circuit includes mutually parallel-connected phase modules corresponding in number to the number of phases of said first polyphase AC power supply, and said single-phase self-excited inverter circuit includes two phase modules.

3. The power converter as set forth in claim 2, wherein said phase module includes self-arc-extinguishing type semiconductor devices.

4. The power converter as set forth in claim 2, wherein said phase modules of said single-phase self-excited inverter circuit has a current rating greater than that of said phase modules of said polyphase self-excited rectifier circuit.

5. The power converter as set forth in claim 1, wherein said DC link circuit includes a filter capacitor having opposite terminals charged at different

potentials, and said single-phase self-excited inverter circuit selectively outputs one of the different potentials at the opposite terminals of said filter capacitor in a single phase.

6. The power converter as set forth in claim 1, wherein said DC link circuit includes filter capacitors being connected in series with one another and having three terminals charged at different potentials, and said single-phase self-excited inverter circuit selectively outputs one of the different potentials at said three terminals in a single phase.

7. The power converter as set forth in claim 1, wherein said input transformer group includes said input transformer having said one primary winding and said secondary windings corresponding in number to the number of phases of said polyphase AC load.

8. The power converter as set forth in claim 1, wherein said input transformer group includes said input transformers corresponding in number to the number of phases of said polyphase AC load, each of said input transformers having said one primary winding and said one secondary winding.

9. The power converter as set forth in claim 6, wherein said input transformer group includes said input transformers corresponding in number to the number of phases of said polyphase AC load, each of said input transformers having said one primary winding and at least one pair of secondary windings comprising a star connection and a delta connection, and said polyphase self-excited rectifier circuit includes two polyphase diode rectifier circuits which are connected in parallel to said filter capacitors, respectively, of said DC link circuit, and at the same time connected with said star connection side and said delta connection side, respectively, of said paired secondary windings.

10. The power converter as set forth in claim 6, wherein said input transformer group includes said one input transformer having said one primary winding and a plurality of pairs of secondary windings corresponding in number to the phases of said first polyphase AC load, each pair of said secondary windings comprising a star connection and a delta connection, and said

polyphase self-excited rectifier circuit includes two polyphase diode rectifier circuits which are connected in parallel to said filter capacitors, respectively, of said DC link circuit, and at the same time connected with said star connection side and said delta connection side, respectively, of said paired secondary windings.

11. The power converter as set forth in claim 1, wherein said at least one power unit has a passable input capacity different from that of the others of said power units.

12. The power converter as set forth in claim 1, wherein said at least one power unit has a passable output capacity different from that of the others of said power units.

13. The power converter as set forth in claim 1, wherein said power units arranged at the opposite ends of the cascade connection are connected with two, second and third, polyphase AC power supplies other than said first polyphase AC power supply, so that electric power is input from said first polyphase AC power supply to said power units and output therefrom to said second and third polyphase AC power supplies, or the electric powers of said second and third polyphase AC power supplies are reversely supplied to said first polyphase AC power supply.

14. The power converter as set forth in claim 1, wherein said plurality of power units are divided into a plurality of groups, in each of which mutually adjacent ones of said power units in each phase are sequentially cascaded in series with one another, and one of said power units at one end of the cascade connection is connected with said polyphase AC load, and another one of said power units at the other end of the cascade connection is connected with said neutral point, or said power units at the opposite ends are respectively connected with two, second and third, polyphase AC power supplies other than said first polyphase AC power supply.

15. The power converter as set forth in claim 1, wherein each of said power units includes a plurality of power cells each having a phase module and said DC link circuit includes a filter capacitor having opposite terminals charged at different potentials, said phase module including a plurality of direct

current buses of different potentials, which are connected with said filter capacitor, and a cooling header, which are arranged in parallel to said direct current buses for guiding a cooling medium to flow therethrough.

16. The power converter as set forth in claim 5, wherein each of said power units includes a plurality of power cells each having a phase module, and when there takes place abnormality in said phase module, said single phase self-excited inverter circuit forcibly fixes the state of switching of said phase module so as to inhibit an electric current from flowing into said filter capacitor of said DC link circuit.

17. The power converter as set forth in claim 1, wherein said first polyphase AC power supply is provided with a turbogenerator group including a plurality of turbogenerators, and said polyphase AC load comprises an electric motor for driving a compressor.

18. The power converter as set forth in claim 1, wherein said DC link circuit includes a filter capacitor having opposite terminals charged at different potentials, and the poly-phase self-excited rectifier circuit adjusts the input power factor thereof so that the potential of the opposite terminals can be properly controlled.

19. The power converter as set forth in claim 1, wherein said DC link circuit includes filter capacitors being connected in series with one another and having three terminals charged at different potentials, and the poly-phase self-excited rectifier circuit adjusts the input power factor thereof so that the potentials of the three terminals can be properly controlled.